WHAT IS CLAIMED IS:

1. A fusion device for facilitating arthrodesis in the disc space between adjacent vertebrae, comprising:

an elongated body having a length and a first diameter at a first end sized to be greater than the space between the adjacent vertebrae, said body further defining a hollow interior sized to receive bone graft material therein;

said body having an outer surface with a pair of opposite cylindrical portions and a pair of substantially flat opposite side walls between said opposite cylindrical portions, said side walls extending along a substantial portion of said length of said body; and

external threads defined on said pair of opposite cylindrical portions of said outer surface and extending along substantially the entire length of said body.

2. The fusion device according to claim 1, wherein said body is tapered along a substantial portion of said length and includes a second diameter at a second end thereof that is greater than said first diameter.

3. The fusion device of claim 1, further comprising a number of openings defined in said opposite side walls for communicating with said hollow interior.

4. The fusion device of claim 3, further comprising a pair of diametrically opposed slots defined through said threads in said cylindrical portion and communicating with said hollow interior, said opposed slots being elongated along said length of said body, and being larger than said number of openings.

5. The fusion device of claim 1, further comprising a pair of diametrically opposed slots defined through said threads in said cylindrical portion and communicating with said hollow interior, said opposed slots being elongated along said length of said body.

6. The fusion device of claim 5, wherein said opposed slots are rectangular in configuration and have a width dimension transverse to said length of said body; and

said cylindrical portions have an effective width between said opposite side walls and said opposed slots,

wherein said width dimension of said opposed slots is greater than said effective width of said cylindrical portions.

7. The fusion device of claim 1, wherein:

said flat side walls terminate near said first end; and

said cylindrical portions and said threads are interrupted by said side walls and circumferentially continuous thereafter at said first end.

8. The fusion device of claim 1, wherein said body is closed at said first end and is open to said hollow interior at a second end opposite said first end.

9. The fusion device of claim 1, wherein said body includes a second end opposite said first end, said second end being open to said hollow interior.

10. The fusion device of claim 7, wherein:

said body includes a second end opposite said first end; and

said flat side walls terminate at said second end.

11. The fusion device of claim 10, wherein said opposite side walls each define a notch at said second end configured to receive a driving tool for implanting said device.

12. A fusion device for facilitating arthrodesis in the disc space between adjacent vertebrae, comprising:

an elongated body having a length, a first diameter at a first end and a larger second diameter at a second end opposite said first end, said first and second diameters sized to be greater than the space between the adjacent vertebrae, said body further defining a hollow interior sized to receive bone graft material therein;

said body having an outer surface tapered from said first diameter to said second diameter with external threads defined thereon and extending along substantially entirely along said length of said body.

13. The fusion device of claim 12, further comprising a pair of diametrically opposed slots defined through said threads in said outer surface and communicating with said hollow interior, said opposed slots being elongated along said length of said body.

14. The fusion device of claim 12, wherein said body is closed at said first end and is open to said hollow interior at said second end.

15. A driving tool for implanting an interbody fusion device in the space between adjacent vertebrae, the fusion device including a body having a cylindrical outer surface interrupted by opposite flat side walls, the outer surface having external threads defined thereon, said tool comprising:

an elongated shaft; and

a pair of opposite tongs connected to one end of said shaft by a hinge, wherein said tongs are biased apart relative to each other;

each of said tongs having inward facing surfaces configured to contact the opposite flat side walls of the fusion device and outward facing surfaces configured to conform to the cylindrical outer surface of the fusion device.

16. The driving tool according to claim 15, in which the fusion device includes openings defined in the flat side surfaces, wherein said inward facing surfaces of each of said tongs includes a finger extending therefrom and arranged to project into a corresponding one of the openings in the flat side surface of the fusion device when the inward facing surface contacts the flat side surface.

17. The driving tool according to claim 15, further comprising a sleeve concentrically disposed about said shaft and axially movable thereon to compress said hinge to push said tongs toward each other, whereby said tongs grip a fusion device disposed between said tongs.

18. The driving tool according to claim 17, wherein said sleeve is threadedly engaged to said shaft to move axially along the length of said shaft as the sleeve is rotated about the threaded engagement.

19. The driving tool according to claim 17, wherein:

said tongs include a tapered surface adjacent said hinge; and

said sleeve has a tapered chamfer on an inner surface of said sleeve, said tapered chamfer being complementary with said tapered surface such that said tapered chamfer travels along said tapered surface as said sleeve is moved axially toward said tongs to compress said hinge.

20. The driving tool according to claim 15, in which the fusion device has a pair of opposite slots defined in an end of the device, wherein said tongs include driving projections extending from said inward facing surface, said driving projections configured to engage the opposite slots in the fusion device.

21. A driving tool for implanting an interbody fusion device in the space between adjacent vertebrae, the hollow fusion device including a body having a cylindrical inner surface and a cylindrical outer surface interrupted by opposite flat side walls, the outer surface having external threads defined thereon, said tool comprising:

an elongated shaft;

a pair of opposite tongs connected to one end of said shaft, wherein said tongs are disposed apart relative to each other to receive the opposite flat side walls of the fusion device therebetween; and

an expanding collet assembly connected to said elongated shaft and having a portion expandable from a first diameter sufficiently small to be disposed within the interior of the hollow fusion device to a larger second diameter sufficient to grip the interior of the fusion device.

22. The driving tool according to claim 21, wherein said expanding collet assembly includes:

a head integral with said pair of opposite tongs, said head defining a central bore therethrough and an annular flage at one end of said bore adjacent and interior to said tongs; and

an expander shaft slidably disposed within said central bore, said expander shaft having a tip flared from a first diameter sufficiently small to slide within said central bore and a larger second diameter adjacent said annular flange when said expander shaft is disposed within said central bore,

whereby when said expander shaft is retracted into said central bore, said flared tip progressively expands said annular flange into engagement within the interior of the fusion device.

23. A method for implanting a fusion device in the intra-discal space between adjacent vertebrae comprising the steps of:

a) providing a hollow fusion device having a cylindrical outer surface interrupted by opposite flat side walls, the outer surface having external threads defined thereon;

b) filling the interior of the fusion device with bone graft material;

c) drilling a hole in the adjacent bone at the minor diameter of the external threads of the fusion device;

d) inserting the fusion device into the drilled hole with the flat side surfaces facing the adjacent vertebrae; and

e) rotating the fusion device within the hole so that the external threads engage the adjacent vertebrae.

24. The method according to claim 23 wherein:

the step of providing a hollow fusion device includes providing a fusion device that is tapered from a larger first end to a smaller second end; and

the step of inserting the fusion device includes inserting the device such that the taper of the device will correspond to the normal anatomic angular relation between the adjacent vertebrae.

25. The method according to claim 24 wherein the drilling and inserting steps are performed posteriorly.

26. The method according to claim 23 comprising the additional step of providing a sleeve in contact with the adjacent vertebrae and aligned with the intra-discal space to provide a working channel for the drilling and insertion steps.

27. A method for implanting a fusion device in the intra-discal space between adjacent vertebrae, comprising the steps of:

a) providing a hollow fusion device having a tapered cylindrical outer surface with external bone engaging threads;

b) drilling a hole in the vertebral end plates on opposite sides of the intra-discal space, the drilled hole having the minor diameter of the external threads of the fusion device; and

c) threading the fusion device into the drilled hole to a predetermined depth within the drilled hole such that the adjacent vertebrae are angularly spread apart by the tapered outer surface of the fusion device to restore a predetermined angular relationship between the adjacent vertebrae.